REMARKS

This is in response to the Office Action mailed 00/00/2007. This response should obviate outstanding issues and make the remaining claims allowable. Reconsideration of this application is respectfully requested in view of this response.

STATUS OF CLAIMS

Claims 23-44 are pending.

Claims 23-44 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement.

Claims 23-44 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention.

Claims 23-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over O'Neil et al. (US6889226) in view of Rizzo et al. (USPA2004/0068500A1).

OVERVIEW OF CLAIMED INVENTION

The present invention provides for an extensible identification system for nodes in a hierarchy, wherein each node is assigned a concatenation of decimal based values. The identification value uniquely identifies the node, provides an order for the node, and identifies its parent, child, and sibling relationships with other nodes. Also, **the IDs assigned can be encoded (via for e.g., binary encoding)** to be byte comparable. Furthermore, the IDs assigned to nodes need not be modified when changes (adding/deleting a child node or a subtree of nodes)

are made in the hierarchy. Additionally, in the event of such a change, the order and relationships between the parent, child, and sibling nodes are retained.

The present invention provides for a robust method for updating a computer-stored hierarchical structure of nodes via a node identification technique, wherein **the nodes of the hierarchical structure are stored as encoded values (e.g., binary encoded values)** and wherein the method comprises the steps of: (a) receiving an instruction to insert a new node at an insertion point in a computer-stored hierarchical structure; (b) identifying one of, or a combination of the following: a left node ID value closest to the left of the insertion point or a closest right node ID value closest to the right of the insertion point; (c) calculating a new ID value based upon node ID value(s) identified in (b), said calculated value greater than ID values of nodes to the left of said insertion point and less than ID values of nodes to the right of said insertion point, **said new ID value based upon a low/high key value, said high key value representing a highest encodable value (e.g., 1111) and said low key value representing a lowers encodable value (e.g., 0000)**; and (d) **encoding the calculated new ID value and updating the computer storage with the encoded value**, wherein as a result of such an implementation, the order, node ID values, and relationships between parent, child, and siblings in the hierarchical structure of nodes stored in the storage remain unchanged with the insertion of new nodes.

The present invention provides a way for assigning IDs to nodes in a hierarchy and provides many advantages, some of which include: (a) the IDs provide a way of ordering nodes in a hierarchy; (b) the IDs describe a node's parent, child, and sibling relationships; (c) the IDs

can be encoded such that they are byte comparable; (d) the IDs can be assigned to newly inserted nodes, anywhere in the hierarchy, and still maintain these properties; and (e) the IDs, once assigned, do not have to change even with changes to the hierarchy.

REJECTIONS UNDER 35 USC §112, 1st AND 2nd PARAGRAPHS

Claims 23-44 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 23-44 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the Examiner states that the "even though positive and negative infinity values are possible in theory as an abstract concept, computer memories could not hold either an positive or negative infinity number because computer memories are tangible and only accommodate a finite range of values".

Applicants agree with the Examiner's statement that it is not possible to store positive or negative infinity values in computer storage. However, Applicants respectfully disagree with the Examiner's assertion that such a feature is taught by Applicants' independent claims, as Applicants have NOT claimed the feature of storing positive or negative infinity numbers. Applicants previously pending independent claims specifically recite the features of a high key value **representing** positive infinity and a low key value **representing** negative infinity. Applicants wish to note that the feature of **representing** a positive or negative infinity by a high key value (e.g., 1111) and low key value (e.g., 0000), respectively, is NOT the same as storing positive or negative infinity values.

However, in the spirit of moving prosecution forward, Applicants have clarified the pending independent claims to recite "a highest encodable value" and "a lowest encodable value". Applicants respectfully submit that this clarifying amendment is fully supported by the specification as filed. For clarification, the Examiner is requested to review Table 3 of the application-as-filed (a copy of which is reproduced below for the ease of the Examiner), which shows an example of how IDs are encoded.

Binary Code	Symbol
0001 0111 1111	-9
0001 1000	-8
0001 1110	-2
0001 1111	-1
0010	0
0011	1
0100	2
0101	3
0110	4
0111	5
1000 0000	$5 + 2^0$
1001 1111	$5 + 2^5$
1010 1111 1111	$5 + 2^{5} + 2^{8}$
1011 0111 1111 1111	$..+ 2^8 + 2^{11}$
1111	**+x Positive Infinity**
0000	**-x Negative Infinity**
0001	Negative Sign

Table 3

For ease of the Examiner the +x and –x values representing positive infinity and negative infinity have been bolded. These bolded entry of the highest encodable value of 1111 represents +x , while the bolded entry of the lowest encodable value of 0000 represents –x.

Applicants, therefore, respectfully request the Examiner to withdraw the 35 U.S.C. §112 rejection with regards to pending claims 23-44.

REJECTIONS UNDER 35 USC § 103

Claims 23-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over O'Neil et al. (US 6,889,226), hereafter, O'Neil, in view of Rizzo et al. (US 2004/0068500A1), hereafter Rizzo. To establish a prima facie case of obviousness under U.S.C. §103, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Additionally, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Applicants contend, that the Examiner, based on the office action of 08/02/2007 has failed to establish a prima facie case of obviousness under U.S.C. §103.

O'Neil teaches a technique for representing the structure of hierarchically-organized data in a non-hierarchical data structure, such as a relation, wherein the hierarchically-organized data is represented as a tree, and each node in the tree is assigned a position identifier that represents both the depth level of the node within the hierarchy, and its ancestor/descendant relationship to other nodes.

Rizzo teaches a data sorting apparatus comprising a storage sorter that sorts a data set according to a defined criteria and a query mechanism that receives intermediate sorted data

values from the storage sorter and compares the intermediate sorted data values to at least one key value.

Applicants independent claim 23, by stark contrast, teaches a robust computer-based method for updating a computer-stored hierarchical structure of nodes via a node identification technique, wherein **the nodes of the are stored as encoded values in a computer storage**, and the method comprising the steps of: (a) receiving an instruction to insert a new node at an insertion point in said computer-stored hierarchical structure; (b) identifying one of, or a combination of the following: a left node ID value closest to the left of said insertion point or a closest right node ID value closest to the right of said insertion point; (c) calculating a new ID value based upon node ID value(s) identified in (b), said calculated value greater than ID values of nodes to the left of said insertion point and less than ID values of nodes to the right of said insertion point, wherein **the new ID value based upon a low/high key value, said high key value representing a highest encodable value and said low key value representing a lowest encodable value**; and (d) **encoding said calculated new ID value and updating said computer storage storing said nodes of said hierarchical structure with said encoded value, wherein order, node ID values, and relationships between parent, child, and siblings in said hierarchical structure of nodes stored in said storage remain unchanged with said insertion of new node**.

O'Neil et al.'s Figures 5 and 6 show how data can be inserted (or "careted") into a hierarchical data structure. O'Neil's structure is restrictive in the fact that only odd numbers are used as position numbers for nodes. It can be seen from the Figures 5 and 6 that nodes are

numbers with **odd numbers** (1.1, 1.2.1, 1.2.3, 1.3, 1.5, etc.), as by O'Neil's own admission (in column 8, lines 36+) "odd numbers are used in the position numbers for nodes 502-508; in a preferred embodiment, ***even numbers are explicitly omitted from the numbering scheme***."

By stark contrast, the claimed invention node insertion/deletion scheme is more robust as it is NOT limited by considerations of even and odd nodes. Specifically, during insertions/deletions, claim 23 teaches the feature of calculating a new ID value based upon a set of identified node ID value(s), wherein **the new ID value based upon a low/high key value, said high key value representing a highest encodable value** (e.g., a new value based on high value +x representing a binary encoding where the highest encodable value is 1111) and **said low key value representing a lowest encodable value**; (e.g., a new value based on low value -x representing a binary encoding where the lowest encodable value is 0000). O'Neil fails to teach updating nodes in computer storage based on a high key and/or low key value. Therefore, Applicants respectfully submit that such features are neither taught nor suggested by the O'Neil reference.

The presently claimed invention can be distinguished from O'Neil because the claimed invention uses the notion of a positive infinity number 'x' (representing the highest encodable value such as 1111) and negative infinity number '0' (representing the lowest encodable value such as 0000) to define the boundary of subtrees (see, for example, Table 3 of the application-as-filed). For example, to insert between 1.1 and 1.2, we use the number 1.1.x.1. The x (positive infinity) is higher than any value that can represent any node within the subtree under 1.1. So under 1.1, the first child could be 1.1.1, second child is 1.1.2, third 1.1.3 and so on. But a child of

1.1 can never be equal to or greater than 1.1.x because x is higher than any value. Because of this, the range 1.1 < a < 1.1.x can be used to define the nodes within the subtree of 1.1. The same argument applies to '0', where 0 represents negative infinity (which is used to go in the opposite direction).

Rizzo teaches a "**key field range**" between positive infinity and negative infinity (much like any range that extends from negative infinity to positive infinity). However, **there is no teaching for such a key field range to be used to represent low and high key values in node ID calculations**. Further, the Examiner has provided **no evidence** for how the combination of O'Neil and Rizzo would have provided a teaching for **a key field range that is used to represent low and high key values in node ID calculations**. Applicants, therefore, respectfully assert that the combination of O'Neil and Rizzo would not have provided for the features of Applicants' pending claim 23.

Even if one were to assume that these disparate teachings can be combined, Applicants respectfully assert that the Examiner has failed to show any evidence of why such a mere range can be interpreted to represent low and high key values that can be combined with the teachings of Rizzo to calculate node values.

The Examiner is reminded that the burden of combining references cannot be satisfied by simply asserting that the modification would have been "well within the ordinary skill of the art." As the CAFC stresses for a §103 rejection to stand, the Examiner is required to show **with evidence** the desirability of making the specific combination at issue. That evidence is required

to counter the powerful attraction of a hindsight-based obviousness analysis. See, for example, In re Lee, 277 F.3d 1338, 1343, 61 U.S.P.Q. 2d 1430, 1433 (Fed. Cir. 2002) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references"). It is respectfully submitted that this involves more than a mere bold assertion that it would be obvious to combine the cited references. With respect, the Examiner has failed to provide any evidence as to why one of ordinary skill in the art would be motivated to combine the teachings of O'Neil and Rizzo.

In re Lee requires that the record must state with particularity all the evidence and rationale on which the PTO relies for a rejection and sets out that it is necessary to explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious. Also, under Lee, the PTO must state in writing the evidence on which it bases its rejection. With respect, the present office action falls short of this requirement.

Absent such teachings, the combination of O'Neil and Rizzo cannot teach or suggest the features of independent claim 23.

Applicants also assert that O'Neil and Rizzo, either singularly or in combination, fail to teach or suggest claim 23's feature of <u>**encoding said calculated new ID value and updating said computer storage storing said nodes of said hierarchical structure with said encoded value,** wherein order, node ID values, and relationships between parent, child, and siblings in</u>

said hierarchical structure of nodes stored in said storage remain unchanged with said insertion of new node.

Absent such teachings, the combination of O'Neil and Rizzo cannot teach or suggest the features of independent claim 23. Hence, Applicants respectfully contend that the combination of O'Neil and Rizzo cannot render obvious the teachings of Applicants' claim 23. The above-mentioned arguments substantially apply to independent claim 31 and 39. Therefore, at least for the reasons set forth above, Applicants respectfully assert that the combination of O'Neil and Rizzo cannot render obvious the teachings of Applicants' independent claims 31 and 39.

The above-mentioned arguments with respect to the independent claims 23, 31, and 39 substantially apply to the dependent claims 24-30, 32-38, 40-44 as they inherit all the features of the claim from which they depend. Therefore, at least for the reasons set forth above, Applicants respectfully assert that the combination of O'Neil and Rizzo cannot render obvious the teachings of Applicants' dependent claims 24-30, 32-38, 40-44.

Therefore, Applicants respectfully request the Examiner to withdraw the 35 U.S.C. §103 rejections with respect to pending claims 23-44, and further requests allowance thereof.

SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of Applicants' presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

As this response has been timely filed, no request for extension of time or associated fee is required. However, the Commissioner is hereby authorized to charge any deficiencies in the fees provided to Deposit Account No. 09-0460.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact Applicants' representative at the below number.

Respectfully submitted,

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